PERFORMANCE OF SOCIOPATHS, ANXIETY NEUROTICS, AND NORMALS ON A COMPLEX PERCEPTUAL TASK UNDER CONDITIONS OF LIMITED STIMULUS EXPOSURE DURATIONS

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This Endeavor Is Dedicated in Memory of

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CHAPTER I

INTRODUCTION

Overview

This investigation involves the relationship of anxiety and response to sensory stimulation to performance, under conditions of restricted stimulus exposure durations, in a problem-solving situation. Two nosological groups and a group of normals will be used to study the interaction of these variables.

By way of introduction to the problem and background for the experiment, researches will be cited which indicate that high anxiety has a deleterious effect on performance in the time-limited, complex problem-solving situation. Sociopaths and anxiety neurotics will be contrasted in regard to manifest anxiety. Then researches will be cited regarding differential effects of sensory stimulation on the two nosological groups. A possible relationship between anxiety and response to sensory stimulation is suggested. Finally, predictions are made regarding differential performance of the two groups in question on a complex perceptual task involving a range of stimulus exposure durations (SEDs). The predictions are predicated on group differences in manifest anxiety and response to sensory stimulation.

Anxiety

There is no dearth of researches showing that high anxiety level has a significant detrimental effect on performance in the timed problem-solving situation. In fact, it appears that in many situations Ss manifesting varying degrees of anxiety may achieve comparable scores under conditions of no time limits but that when time limits are imposed, there are reliable significant differences, i.e., anxiety appears detrimental in the timed testing situation. As an illustration, Matarazzo et al. (1954) sought to determine if differences in mean learning abilities of seven groups, graduated on Taylor Manifest Anxiety Scale (MAS) scores, were due to differences in anxiety level or intellectual level. They found no differences in grade-point averages for the previous year for the groups. However, a significant relationship appeared between ACE scores and anxiety level ($r = -.25; < .01$). Both Q and L portions of this test had the same relationship to anxiety scores. They correctly suspected that the time factor on the ACE accounted for the variance of scores, however, because administration of the CVS, an abbreviated, untimed form of the Wechsler-Bellevue, revealed no relationship between scores on this untimed intelligence test and anxiety scores. Harleston (1962) concluded that his low-anxiety Ss performed at a faster rate than high-anxiety and middle-anxiety Ss on addition and subtraction problems which resulted in a significantly better score for the low-anxiety Ss. On anagrams, low-anxiety Ss solved the highest number and high-anxiety Ss the fewest within the time limit. Siegman (1956) found that high-anxiety Ss, as measured by the MAS, had significantly lower scores than low-anxiety Ss on "time-limited subtests of the WAIS." He concluded that anxiety has a disruptive effect on timed intelligence tests. Buttiglieri (1955) also administered the WAIS to groups of high and low scorers on the MAS. He found a non-statistically-significant trend which suggested that high anxiety was associated with faster performance on easy tests and slower performance on difficult ones. This suggests that task difficulty may be an important variable.

Cleckley (1941) has observed that

> Those called psychopaths are very sharply characterized by the lack of anxiety (remorse, uneasy anticipation, apprehensive scrupulousness, the sense of being under stress or strain) and, less than the average person, show what is widely regarded as basic in the neurotic.... It is doubtful if in the whole of medicine any other two reactions stand out in clearer contrast (pp. 287-288).

Experimental research findings corroborate Cleckley's view of the sociopath as being relatively free from anxiety in contrast to the anxiety neurotic. Lykken (1957) concluded that those persons exhibiting the sociopathic syndrome described by Cleckley were 1) clearly inferior to normals in ability to develop (condition) anxiety, and 2) showed abnormally little manifest anxiety in "a life situation normally conducive to this response." These Ss also scored significantly lower than normals on the MAS. The "life situation" was an anxiety scale the author constructed which involved a series of choices of two situations, one more anxiety arousing to normals than the other. The Cleckley sociopaths scored significantly differently from normals to prompt Lykken to conclude that they evidenced little or no anxiety on this measure also.

Sherman cites an unpublished experiment by Fairweather in which the latter administered the MAS to prisoners and found that those _S_s classified sociopath scored significantly lower than the ones classified normal or neurotic (Fairweather, 1957).

White (1959) surveyed the literature on "abnormal behavior" from April, 1957, through April, 1958, and concluded that experimental research leaves little doubt that sociopaths and delinquents are relatively free from anxiety (p. 271).

Sensory stimulation

Of interest to this study are experimental findings which suggest that sociopaths and anxiety neurotics are well contrasted in regard to response to sensory stimulation. Petrie and her collaborators have done a series of experiments which suggest that the sociopath seeks a relatively high amount of sensory stimulation (Petrie _et al._, 1958, 1960, 1962; Petrie, 1960). They found that certain _S_s showed a relatively low amount of stimulation effect on a kinesthetic task (underestimated the size of a wooden block handled while blindfolded) and other _S_s reported a relatively high amount of stimulus effect under these same conditions. They found that the _S_s showing low stimulation effect were relatively intolerant of the sensory deprivation condition in contrast to _S_s showing a high effect, i.e., they found that sensory deprivation tolerance was negatively related to satiability. These researchers tested sociopaths, as defined by Eysenck's Maudsley questionnaire, and tested a group of juvenile delinquents. They concluded that Ss showing a low effect on the kinesthetic task corresponded well to those classified as sociopaths. Although no similar test was made of Ss classified as anxiety neurotics, the general findings of the Petrie group suggest that the individuals showing the most effect on the kinesthetic task would be those with anxiety neurotic tendencies.

Wiesen (1965), using Minnesota Multiphasic Personality Inventory (MMPI) patterns as selection criteria, tested the hypothesis that persons with sociopathic tendencies seek a high amount of sensory stimulation and those with anxiety neurotic tendencies seek a low amount of sensory stimulation. He found that Ss with sociopathic tendencies did, in fact, condition only when the operant was an onset of the experimental stimuli (bright colored lights and music in a dimly lighted room), whereas Ss with anxiety neurotic tendencies conditioned only when the operant was cessation of this stimulation.

Interaction of anxiety and sensory stimulation

Lykken's experiment (1957) illustrates a possible interaction between anxiety and response to sensory stimulation in the two groups in question. He found that Ss diagnosed primary sociopaths and manifesting such symptoms as impulsiveness and lack of normal affect in experience failed to accrue anxiety in a shock-avoidance situation in contrast to normals and neurotics. These sociopathic _S_s scored significantly lower than neurotics and normals on the MAS.

Perhaps anxiety level and response to sensory stimulation are reflected in speed and persistence; i.e., possibly the anxious person avoids high amounts of sensory stimulation and is thus slow and persistent (Several researches suggest that the anxiety neurotic tends to be retarded in complex reaction time, i.e., slow; Eysenck _et al_., 1957, pp. 89-94; Siegman, 1956; Stabler and Dyal, 1963). Also, the clinically ascribed trait of obsessive-compulsiveness suggests persistence in the anxiety neurotic (Guthrie, 1956). Slowness precludes rapid stimulus configuration change which, in turn, minimizes sensory stimulation (Helson, 1964a, p. 234). The sociopath with negligible manifest anxiety, however, tends to be impulsive (Lykken, 1957) which provides him with a fast-changing stimulus configuration, i.e., stimulation, which he may select if given an option (Wiesen, 1965). Thus, a complex relationship between anxiety and reaction to sensory stimulation seems evident.

Eysenck _et al_. (1957) suggest that on the timed cognitive-perceptual task, performance is a function of speed and persistence (p. 98). This writer is in basic agreement with this suggestion if reasoning ability (i.e., ability to run through syllogisms in a systematic way) is held constant. It would thus seem that optimal performance on such a task would obtain from good reasoning ability and optimal weighting of speed and persistence. Those persons classified as sociopaths and those classified as anxiety neurotics seem to exhibit differential anxiety levels and differential responsiveness to sensory stimulation. Anxiety level and response to sensory stimulation seem to significantly affect performance on the time-limited, complex perceptual task. Therefore, these two groups were chosen for testing hypotheses involving the variables of anxiety and response to sensory stimulation as they affect performance under conditions of varying limitations of SED.

Given a timed testing situation involving a complex task, we might predict the following from the above theoretical assumptions: 1) If speed were weighted extremely heavily and persistence extremely lightly in the problem solver, he would advance at a rapid rate but not linger long enough for optimal efficiency on a problem in which the solution was not quickly forthcoming; 2) If speed were weighted extremely lightly and persistence extremely heavily in the problem solver, he would advance slowly but linger relatively long on a difficult problem, having time for more trial-and-error behavior than the fast-paced problem solver. Thus, these two hypothetical problem solvers may achieve similar scores under certain conditions such as unlimited time, but it is obvious that the factor of time might be manipulated to favor one or the other; i.e., a relatively short time allowed per problem would advantage the fast but non-persistent individual because he would feel more comfortable with a relatively short interval and he would not make use of extra time for hypothesis formation. But a relatively long time allowed per problem would advantage the persistent individual who would feel more comfortable at a relatively long interval and may utilize it in persistent hypothesis testing. A relatively medium amount of time per problem would advantage the person who shows speed and persistence in about equal proportions. Thus, it is apparent that the concept of _optimal time_ is appropriate to help explain this hypothesized scheme whereby individuals confronted with a variety of stimulus exposure intervals would score optimally (achieve their maximum scores) at different intervals, according to certain consistent personality characteristics, i.e., anxiety, speed, persistence. Research cited (Petrie _et al_., 1958, 1960, 1962; Petrie, 1960; Wiesen, 1965) suggests that the sociopath fits the description of someone who may be expected to adapt quickly to the task stimulus and thus to exhibit relatively high speed in the testing situation but relatively low persistence because of his apparent need for a relatively high amount of sensory stimulation and cursory approach to problem solving. The anxiety neurotic, on the other hand, may be one who conversely exhibits significant inhibition, slowness, and persistence because of his desire to minimize sensory stimulation, and this should slow his pace in contrast to the sociopath. There seems to be little relevant research regarding sociopaths' performance in the timed problem-solving situation. But it is reasonable to assume that _Ss_ of this type who characteristically manifest little or no anxiety and who seek to change the stimulus field frequently (Petrie _et al_., 1962;

Wiesen, 1965) would perform differently from anxiety neurotics and from persons who show neither of these tendencies, on tasks which are evidently affected by _S_s' manifest anxiety and on which there is motivation to perform well. Specific hypotheses will subsequently be advanced regarding the differential performance of such _S_s in a specified experimental situation.

Subjects with sociopathic tendencies and those with anxiety neurotic tendencies appear sufficiently differentiated in regard to life style and ways of coping with potentially anxiety-arousing situations, in particular, to perform differently in a problem-solving situation in which stimulus exposure duration varies over a wide range. Normals, who should exhibit speed and persistence in more equivalent proportions and who respond to sensory stimulation neither as adversely as the anxiety neurotic nor as positively as the sociopath, would not be at a serious disadvantage, as compared to the other two groups, at either end of the stimulus exposure duration continuum. They might, therefore, exhibit optimal performance in an SED between those SEDs optimal for the two experimental groups.

Use of college students, to test this prediction, in a problem-solving situation somewhat resembling the orthodox academic testing situation, should insure at least a moderate amount of motivation to perform well.

A frustrating situation should exaggerate the differences between the two experimental groups as the _S_s with anxiety neurotic tendencies should become even more anxious and perseverative and thus exhibit a slowing of pace. The Ss with sociopathic tendencies should not exhibit a decrement in speed under a frustrating condition, however. Normals should not exhibit significant change in optimal SED because they should not exhibit perseveration to the extreme degree to which persons with anxiety neurotic traits do. Thus, there should be a wider separation between the optimal SEDs of the two experimental groups if a frustrating element is introduced into the problem-solving situation.

Hypotheses

For the experiment the following predictions were tested. In a complex problem-solving situation under a condition in which stimulus exposure durations are systematically varied over a wide range of intervals

1. Persons with anxiety neurotic tendencies, persons with sociopathic tendencies, and normals will exhibit different optimal stimulus exposure durations (SEDs), i.e., achieve the highest number of correct problems at different SEDs.

2a. Subjects with sociopathic tendencies will exhibit optimal performance at a task SED significantly shorter than that for normals and Ss with anxiety neurotic tendencies.

2b. Subjects with anxiety neurotic tendencies will exhibit optimal performance at a task SED which is significantly longer than that for normals.

3. The overall performance curves of each of the three groups will follow an inverted-U shape.

4. Introduction of a frustrating condition into this same situation will cause a widening of distance between the optimal SEDs for the two experimental groups.

Regarding Hypothesis 3, Helson (1964b) has theorized appropriately that "the relation between... [tension] and performance is curvilinear, performance being best at intermediate levels of... [tension] and poorer at both low and high levels." Helson's elaborate adaptation level theory includes the concept that, since organisms have internal ("residual") norms, the parameters of sensory adaptation to stimuli will vary greatly. He contrasts this to classical psychophysical concepts which hardly allowed for organismic idosyncrasies. Viewing theory generated for this study within Helson's framework, therefore, the person with sociopathic tendencies adapts temporally sooner, because of his "internal norms." These norms, if higher than those of either the anxiety neurotic or normal, as seems to be suggested, should cause him to function optimally at relatively short intervals of SED. Such a notion is also somewhat consistent with findings that the sociopath seeks an above average amount of sensory stimulation (Petrie _et al_., 1962; Wiesen, 1965); i.e., he gets this at the relatively short SEDs wherein the stimulus is changing relatively rapidly. In contrast, the person with anxiety neurotic tendencies adapts temporally later, in Helson's scheme, because of his "organismic norms" which are conducive to minimizing sensory stimulation. Because the normal has neither the sociopath's extreme affinity nor the anxiety neurotic's extreme aversion for sensory stimulation, then the normal group should exhibit elevation in their performance curve between the optimal SEDs for the experimental groups.

Regarding the inverted U-shaped curves predicted, Helson (1964a) states that

> There are optimal ranges of variables....Within these ranges performance tends to be more accurate, more efficient, and usually more comfortable than with values of variables outside these ranges...If accuracy or sensitivity is plotted, inverted U-shaped curves are found (p. 112).

Currie (1962) found that performance of Ss yielded a general inverted U-shaped function on a complex perceptual task (the same, except at a lower level of difficulty, as that used in the present experiment) in which the SED was varied through a range of intervals. Garrett (1922) found similarly shaped curves for Ss who lifted weights and estimated line lengths under conditions of varying stimulus exposure duration. In both these experiments accuracy was plotted on the ordinate with time interval (SED) on the abscissa. Likewise, Holway et al. (1937), investigating the relationship between "differential sensitivity and frequency," found inverted U-shaped curves for timed weight lifting. They plotted JNDs on the ordinate and frequency on the abscissa.

CHAPTER II

PROCEDURE

Subjects

Ninety male undergraduates at the University of Florida served as Ss for the experiment--30 in the Normal group and 30 in each of the two experimental groups. All Ss had taken the MMPI upon entrance into the University. Group assignment was based on MMPI profiles in the following manner.

Sociopathic group

Subjects in the Sociopathic-tendency Group (4-9) had all validity scales below a T score of 80, scales 4 and 9 as high point scales near or above 70, and all other scales below elevation of scales 4 and 9, with scales 2 and 7 below 60. Dahlstrom and Welsh (1960) noted that persons with the high 4-9 profile pattern

> show clear manifestations of psychopathic behavior, the hypomania seemingly energizing or activating the pattern related to scale 4. That is, these people tend to be overactive and impulsive, irresponsible and untrustworthy, shallow and superficial in their relationships (p. 192).

These authors cite an unpublished experiment by Guthrie, who reported that patients with 4-9 profiles who sought help from an internist had histories of acting-out behavior "covering a wide range of troubles including marital problems, divorce, alcoholism, and illegitimate pregnancies," and added that "these considerations far outweighed their medical problems" (p. 192). These descriptions are clearly consistent with classical descriptions of the sociopath (Cleckley, 1941).

Anxiety neurotic group

Subjects in the Anxiety-neurotic-tendency Group (2-7) had all validity scales below a T score of 80, scales 2 and 7 as high points near or above 70, and all other scales below elevation of scales 2 and 7. Hathaway and Meehl (1956) found that psychiatric patients with high 2 and 7 scales showed depression, anxiety, insomnia, undue sensitivity, tenseness, and nervousness. The frequency of neurotics in this group who were diagnosed obsessive-compulsive was second only to depressive reaction (p. 140). It is not surprising, then, that such individuals should exhibit perseverative behavior when attending to tasks. Guthrie (1956) reports that, of his high 2-7 sample taken from patients consulting an internist, the men exhibited obsessive-compulsive defenses of rigidity and excessive worrying. Guthrie further asserted that the depression component was rather stable over long periods of time and was not easily reversed (p. 179). Scale 2 evidently accrues significant reliability in the context of an anxiety-neurotic-type profile, viz., high 2-7.

Normals

Subjects in the Normal Group had all validity scales below 80. Scales 1 through 0 fell between the 39th and 61st T score values with a few exceptions. Subjects' MMPI data may be seen in Appendix A.

Wiesen (1965) has provided a degree of validation for the selection procedure used in the present experiment as his procedure was highly similar to the present one and his Ss exhibited significantly consistent behavior predicted from theory.

The selection of Ss for this study was accomplished by examining MMPI profile codes for entering male students for the past two years, selecting the ones which met profile criteria, sending a letter (Appendix B) to those chosen, assigning them an appointment for testing, and following the letter with a telephone call on the evening preceding the testing date. In addition, Ss were recruited from introductory psychology courses. The introductory psychology students tested fell mainly in the normal group. However, a few were derived in this manner for the 2-7 and 4-9 groups.

Apparatus

The problem-solving task given the Ss was the block pile drawings from the Army General Classification Test (1947). This test was chosen because it meets the desired characteristics of a complex perceptual-cognitive task; i.e., the stimulus cards consist of two-dimensional drawings of three-dimensional block piles and the determination of the correct number of blocks in each pile requires abstract conceptualization. Each drawing is of increasing difficulty, and it was reasoned that, as the test as a whole has correlated well with adult intelligence tests and shown good predictive ability regarding later achievement, it should tax the problem-solving ability of college Ss adequately without being unrealistically difficult. Of specific relevance to the predicted relationships between performance on this task and personality variables, it apparently is a difficult enough task to require significant attention.

The 60 task stimuli were mounted on cards 8½ by 5½ inches and projected onto a 70- by 70-inch motion picture screen by means of a projector. The projection apparatus was a Squibb-Taylor Opaque Projector, Spotlight TS-5 model, 10- by 10-inch aperture, 1000-watt, blower-cooled lamp, F/3.6 lens. A stopwatch, graduated in fifths of a second, was used to measure the stimulus exposure intervals.

Procedure

Subjects were tested in small groups of five to ten per session. The testing room was semi-dark. Testing was conducted at night, and the room lighting consisted of a 40-watt lamp behind and below the desk on which the opaque projector rested. Subjects were given answer sheets (Appendix C) and, after writing the usual demographic data of name, age, student number, and class, were read the instructions for the experiment (Appendix D). Next, the stimuli were successively projected onto the screen for the specified time interval. After each presentation Ss wrote, in the appropriate space on the answer sheets, their estimate of the number of blocks in the pile. After half of the items in the split-half design were presented, the frustrating condition was introduced. It consisted of writing on each S's answer sheet a code number which supposedly indicated the quality of his work thus far on the test. The E and a procter wrote the numbers on the answer sheets, and then the Ss were told to refer to a table of "norms" listed on a board in the room. They were told that their scores were represented by the last two digits of the four-digit code. The coded scores were deliberately written so that each S appeared to score on the borderline between the range of junior high school and high school students. The other ranges listed, in ascending order, were college undergraduates and graduate students. (Appendix E gives the scores and ranges to which Ss referred. Appendix F gives the instructions in the frustrating condition.)

The last half of the items were then administered as if to resume testing in the same manner. At the end of the session the Ss received an explanation of the experiment as being concerned with the relevance of stimulus exposure duration to performance. They were also told that the feedback given them in the middle of the test was false and designed to frustrate them so its effects on performance might be observed.

Subgroups

Table 1 gives the scheme derived for testing an equal number of *S*s from each group at each of the SEDs. Ninety *S*s who met selection criteria were eventually recruited, which allowed for six for each subgroup (SED and group).

Table 1. Groups, Subgroups, and Stimulus Exposure Durations

Stimulus Exposure Duration (Sec.)		4"	7"	11"	16"	25"
		Subgroup *N*s				
Group	4-9	6	6	6	6	6
	2-7	6	6	6	6	6
	Normals	6	6	6	6	6

CHAPTER III

RESULTS

The data (number of correct responses) were analyzed by use of complex analysis of variance, triple classification, with m cases per cubicle (McNemar, 1955, pp. 311-329). Table 2 gives the results of this analysis.

Table 2. Analysis of Variance of Block Counting Scores

Source	Sum of Squares	df	F
Frustration (F)	5.00	1	.33
Stimulus Exposure Duration (SED)	732.06	4	12.04**
Group	13.14	2	.43
Interaction: F X SED	22.50	4	.37
Interaction: F X Group	2.03	2	.07
Interaction: SED X Group	269.41	8	2.21*
Triple Interaction: F X SED X Group	1,540.96	8	12.67**
Within Cell	2,280.67	150	
Total	3,432.13	179	

$^{*}p < .05$
$^{**}p < .001$

The group means are plotted graphically in Figure 1.

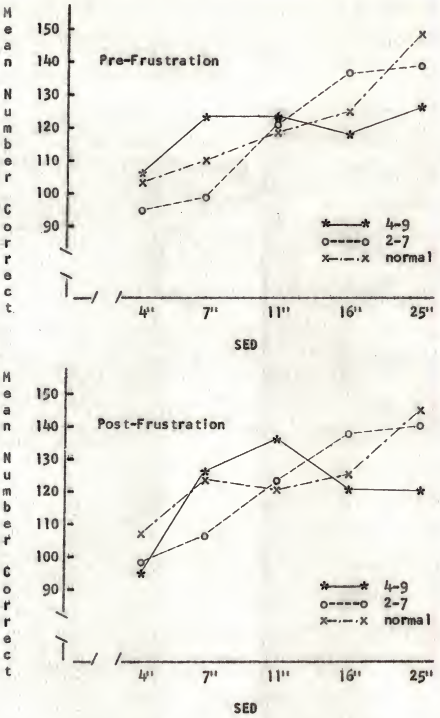


Figure 1. Performance of the Three Groups Before and After Frustration Condition

A more detailed analysis of performance data, as arranged for computation of the complex analysis of variance, may be seen in Table 3.

Table 3. Performance Data for Complex Analysis of Variance

Row			Column			Sum	Mean
	4"	7"	11"	16"	25"		
4-9	105	122	122	117	124	590	118.00
2-7	94	98	120	137	139	598	117.60
Normal	102	110	119	123	148	602	120.40
Sum	301	330	361	377	411	1780	356.00
Mean	100.33	110.00	120.33	125.67	137.00	593.33	118.66

Block A. Pre-Frustration Condition

Row			Column			Sum	Mean
	4"	7"	11"	16"	25"		
4-9	94	125	135	119	118	591	118.20
2-7	96	106	123	137	140	602	120.40
Normal	107	123	120	124	143	617	123.40
Sum	297	354	378	380	401	1810	362.00
Mean	99.00	118.00	126.00	126.67	133.67	603.00	120.67

Block B. Post-Frustration Condition

The statistical analysis suggests that these three groups of male college students do not differ in overall ability on the task used, as the F indicating differences between the groups is not significant and does not approach significance. However, when the stimulus exposure duration is varied systematically over a wide range, then the difference between performance of the three groups becomes significant. The groups performed unequally at the various SEDs. The interaction F of SED by Group is significant beyond the .05 level of probability. Inspection of performance curves in Figure 1 reveals that this is due to the three groups' differential optimal SEDs. Thus, Hypothesis 1, that the three groups would exhibit different optimal exposure durations, is confirmed.

Hypothesis 2a, that the 4-9 group would exhibit optimal performance at an SED shorter than that optimal for normals and for the 2-7 group, is also confirmed. The interaction F of SED by Group is statistically significant beyond the .05 level, and inspection of the performance curves reveals that the optimal interval for the 4-9 group is clearly shorter than that for either of the other two groups.

Hypothesis 2b, that the 2-7 group would exhibit optimal performance at an interval longer than that for normals, was not confirmed. Inspection of Figure 1 reveals that both of these groups performed optimally at the longer intervals.

Hypothesis 3, that the overall performance curves of the three groups would follow the inverted-U shape, was partially confirmed, as the curve of the 4-9 group tended to assume this shape in the pre-frustration condition and somewhat more clearly assumed it in the post-frustration condition.

Hypothesis 4, that a frustrating condition introduced into the experiment would effect a wider separation between the experimental groups, was not confirmed, as the Frustration _F_ was not significant. Although Frustration per se did not seem to affect performance appreciably, it is noted that when this variable is combined with the variables of SED and Group, the latter interaction effect, which was significant beyond the .05 level, becomes significant beyond the .001 level. Thus, frustration, in interaction with Group and SED, does appear to have a significant effect on performance.

CHAPTER IV

DISCUSSION

The data and performance curves clearly show that, as predicted, the 4-9s perform optimally at a relatively short SED, 7 sec., and do not appreciably improve performance thereafter, i.e., when given substantially more stimulus-viewing time. Note that the 25-sec. rise (124) is only two points higher than the 7-11 sec. plateau (122), while these Ss increase from 105 at 4 sec. to 122 at 7 and 11 sec. The optimum performance of the 4-9s appears to be at 7 to 11 sec. The 2-7s exhibit a lower level of performance when compared with the 4-9s at the shorter exposure durations. However, the 2-7s exhibit better performance, evidently at a negatively accelerating rate, at the longer stimulus exposure durations. The optimum SED for the 2-7 group appears to be 16 to 25 sec.

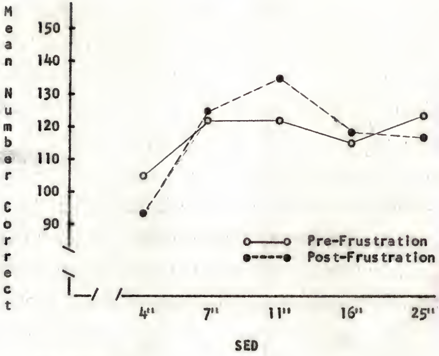
Contrary to prediction, the normals did not exhibit optimal performance at a stimulus exposure duration between the other two groups. An inspection of their performance curves reveals that, over the range of time intervals used, their performance somewhat clearly exhibits a positively accelerating function. Perhaps their lack of either impulsive or obsessive-compulsive traits, as the 4-9s and 2-7s respectively exhibit, frees them to make optimal use of increasing increments of stimulus-viewing time.

The hypothesized inverted U-shaped curves were demonstrated in the present experiment partially by the sociopathic group. Inspection of Figures 1 and 2A reveals that the performance curves of the 4-9 group tend to assume the inverted-U shape as attested by the consistency of the curve shape for both pre- and post-frustration conditions. If given more and progressively longer intervals of stimulus-viewing time, normals might exhibit a plateauing of performance curve, followed by a decrement. This question, plus the question of whether 2-7s would begin to drop in performance at longer intervals, might be answered by further research incorporating such intervals. If the 4-9s' performance curves have exhibited true inverted-U shapes in this experiment and if the 2-7s and controls, in that order of ascendence, should be found to exhibit the same basic curve profiles, then the normals could readily be thought of as being best able to profit from progressively longer increases in exposure time and exhibit this function over the widest range of exposure intervals. The 2-7s would be next in this rank-order, but the 4-9s, who would be last, are probably best at the extremely short intervals (especially under a non-frustrating condition), being considerably better than the 2-7s and somewhat better than the controls at the 4-sec., 7-sec., and 11-sec. intervals, taken as a whole.

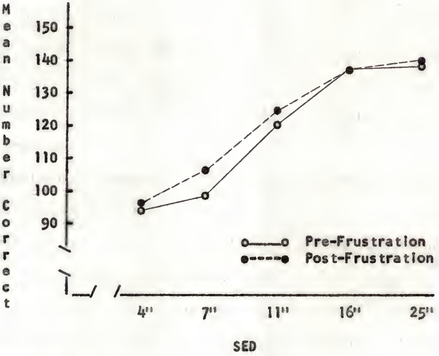
The fact that the frustrating condition per se did not significantly and consistently affect any of the three groups is difficult to interpret. Possibly the condition was only theoretically and not actually frustrating. This is plausible if the Ss did not believe the false feedback they were given, i.e., if it was not credible. It is impossible to conclude whether the Ss gave credence to the feedback, as the experiment included no feature to test this adequately. It was noted that when they were told at the end of the experiment that the feedback was false, a few Ss replied that they realized this. However, when quizzed further about their alleged insight, the reasons given were usually vague and hardly plausible. But it is possible that these college Ss realized that their performance would not likely be depressed to the level of junior high school students. One S spontaneously admitted that he was genuinely fooled by the false feedback. But, if the assumption is made that the Ss generally believed the false feedback, there are still many possible reasons why the frustrating condition per se failed to have a consistent significant effect on each group at the various SEDs. The post-frustration condition always came in the latter half of the session. Hence, there could have been some practice effect because, even though the Ss were given new stimuli, it was after their having had experience with the same type of stimuli. Such an effect could conceivably offset any decrement in performance that might otherwise obtain. Still another explanation is that the Ss' performance was not significantly affected by frustration. However, there was a possible frustration effect of a complex nature involving some Ss giving credence to the false feedback and others not, and differential effects for the groups at different time intervals. Even though the frustrating condition failed alone to have an effect on performance, it raised an interaction effect between SED and Group from a significance level of .05 to .001. That the triple interaction was highly significant suggests that frustration differentially affected the groups at different SEDs. Inspection of Figure 2 and Table 4, which depict performance changes from the pre- to post-frustration conditions, suggests that changes were most marked at the shorter SEDs of 4 sec., 7 sec., and 11 sec. It is noted that in the post-frustration part the normals and 2-7s improved slightly but that the 4-9s did not improve. Therefore, frustration may affect the rank-order of the three groups, although not to a statistically significant degree.

Table 4. Differences in Subgroup Scores Between Pre- and Post-Frustration Conditions

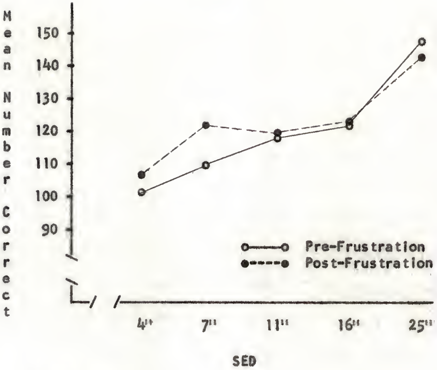
Group	SED				
	4"	7"	11"	16"	25"
4-9	-11	3	13	2	-6
2-7	2	8	3	0	1
Normals	5	13	1	1	5



A. 4-9 Group



B. 2-7 Group



C. Normal Group

Figure 2. Performance Curves for Each Group Before and After Frustration

It would be interesting to determine if relationships found regarding performance of these three groups would hold for other complex perceptual problems. This could be answered by further research.

Implications for performance might be that persons with sociopathic traits would do best in relatively short spurts with relatively frequent rest periods of short duration. Persons with anxiety neurotic traits and persons relatively free from these types of pathology might do best during work periods longer than those for persons with sociopathic traits, and they might need rest periods less frequently but longer in duration. These hypothetical implications for optimal performance are predicated upon 1) the present finding that people with sociopathic tendencies do best at a relatively short SED compared to persons with anxiety neurotic tendencies and normals; and, 2) findings that people with sociopathic tendencies evidently desire a relatively high amount of sensory stimulation while others desire less. Hence, the person with sociopathic tendencies might desire that his activity be fast-changing, i.e., stimulating; whereas the anxiety neurotics and normals might not desire such a fast-paced schedule.

Training implications are likewise speculative, but perhaps the 4-9s would learn relatively more quickly with more concentrated practice than either of the other two groups. This might be consistent with their apparent need for a relatively fast-changing stimulus field and characteristic of finishing the task relatively quickly (or adapting quickly) to enable them to move on to a different activity. The 2-7s might feel more comfortable with spaced practice and longer sessions which preclude fast stimulus change and thus minimize sensory stimulation. The normals might be between these two extremes.

While it is generally tempting to think of the anxiety neurotic as a "jumpy" person with quick reflexes, research has shown that this type of person tends to be retarded in reaction time (Eysenck _et_ _al_., 1957, pp. 89-94; Siegman, 1956; Stabler and Dyal, 1963). This experiment carries this perceptual-motor phenomenon further to conclude that the anxiety neurotic requires a longer stimulus exposure duration than at least one other group (sociopathic) for optimal performance on a complex perceptual task.

Unlike most literature to date which provides only descriptive material on people with sociopathic and anxiety neurotic tendencies (Cleckley, 1941; Hathaway and Meehl, 1956), this experiment provides an operational distinction between these two groups, i.e., how they may differentially perform on a complex perceptual task under conditions of varying stimulus exposure duration.

The present findings also tend to lend some construct validity to use of the MMPI as a selection instrument for people with sociopathic and anxiety neurotic characteristics.

CHAPTER V

SUMMARY

This investigation involved the relationship of anxiety, reaction to sensory stimulation, and restricted stimulus exposure duration (SED) to performance on a complex perceptual task. Persons with sociopathic tendencies and persons with anxiety neurotic tendencies were chosen as Ss in the experiment because they appear well contrasted in regard to the variables of anxiety and reaction to sensory stimulation. In fact, their behavior regarding these variables appears polar. The sociopath appears to characteristically exhibit little or no anxiety and to have an affinity for sensory stimulation, while the anxiety neurotic appears to exhibit a high degree of anxiety and to have an aversion for sensory stimulation.

It was predicted, therefore, that in a complex perceptual task wherein Ss view stimuli over a wide range of SEDs the three groups would exhibit optimal performance at different SEDs. In particular, it was predicted that Ss with sociopathic tendencies would perform optimally at a relatively short interval and Ss with anxiety neurotic tendencies would perform optimally at a relatively long interval. Normals, it was predicted, would exhibit an optimal SED between those of the experimental groups. Further, introduction of a frustrating element into the testing situation was predicted to widen the intervals between the optimal performance of the experimental groups because of their polar ways of reacting to frustration. It was finally predicted that performance curves would be of an inverted-U shape. These hypotheses were predicated upon the reasoning that the shorter SEDs provide a relatively large amount of sensory stimulation which would be relatively positively reinforcing to Ss with sociopathic tendencies and relatively negatively reinforcing to Ss with anxiety neurotic tendencies. The longer SEDs were hypothesized to have the reverse effect upon the two experimental groups. Normals were conceptualized as being relatively free from pathological traits exhibited by the experimental groups.

Subjects were selected on the basis of MMPI profiles. Ninety male University of Florida undergraduates were chosen and most were contacted by mail and telephone. A few were taken from introductory psychology courses. Division of Ss into appropriate groups and subgroups resulted in 30 for each of the three experimental groups and six from each of these groups for each of the five SEDs used.

Testing was conducted with small groups in a semi-dark room. By use of a split-half presentation order, Ss were confronted with 30 of the block pile drawings of the Army General Classification Test. Then a frustrating condition of false feedback on progress was introduced (i.e., informing each S that he was performing below his peer group). Then Ss were confronted with the remaining 30 drawings. Presentation was accomplished by use of an opaque projector and a 70- by 70-inch motion picture screen. Subjects wrote their answers on sheets provided by the E.

Analysis of variance indicated that the Ss were equal in overall performance on the task but that they performed unequally at different SEDs. The relative positions of the optimal SEDs for the two experimental groups were obtained according to predictions. The normals, however, did not exhibit an optimal SED between the other two groups as the performance curves for the normals appeared as a positively accelerating function. The frustrating element failed to have a significant consistent effect on any of the groups, but it evidently significantly affected groups differentially at different SEDs. The hypothesized inverted U-shaped curves were obtained only for the group with sociopathic tendencies.

Results were discussed in terms of performance and training implications for persons with sociopathic tendencies, persons with anxiety neurotic tendencies, and normals. The credibility of the attempt to frustrate the Ss was also questioned. Further research was suggested to explore further the parameters of limited SED for performance of the three groups on this task.

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APPENDICES

APPENDIX A

MMPI Data on Subjects

4-9 Group

T Scores													Rank-Order of Scales
L	F	K	1	2	3	4	5	6	7	8	9	0	
43	55	48	44	44	56	79	65	59	58	63	88	43	9 4 5 8 6 7 3 2 1 0
50	50	66	57	46	64	71	59	56	59	65	78	39	9 4 8 3 5 7 1 6 2 0
50	62	55	59	58	67	71	65	65	58	50	70	49	4 9 3 5 6 1 2 7 8 0
46	46	59	47	41	64	67	53	56	48	48	68	38	9 4 3 6 5 7 8 1 2 0
40	68	43	54	58	56	74	61	62	58	67	68	41	4 9 8 6 5 7 2 3 0 1
60	60	61	44	44	51	74	45	47	48	63	73	43	4 9 8 3 7 6 5 2 1 0
46	53	57	52	58	56	71	59	47	56	59	68	47	4 9 8 5 2 7 3 1 6 0
43	50	42	54	34	56	67	55	50	52	59	81	38	9 4 8 3 5 1 7 6 0 2
46	60	62	54	44	55	67	63	53	58	65	65	46	4 9 8 5 7 3 1 6 0 2
43	62	55	49	59	49	79	57	41	58	53	70	41	4 9 2 7 5 8 1 3 6 0
53	55	61	65	39	64	69	55	62	54	67	68	38	4 9 8 1 3 6 5 7 2 0
53	48	53	65	56	64	81	55	62	54	53	68	45	4 9 1 3 6 2 5 7 8 0
46	64	48	41	46	51	67	65	50	58	65	75	55	9 4 8 5 7 0 3 6 2 1
36	48	57	57	41	60	69	61	47	52	59	85	41	9 4 5 3 8 1 7 6 2 0
50	48	70	57	48	66	71	63	59	59	65	75	35	9 4 3 8 5 7 6 1 2 0
46	64	49	47	53	60	86	73	62	58	69	86	50	4 9 5 8 6 7 3 2 0 1
46	50	66	52	44	62	69	51	56	56	59	73	36	9 4 3 8 6 7 1 5 2 0
50	48	59	54	44	60	67	51	44	46	51	68	41	9 4 3 1 5 8 7 2 6 0
53	48	43	39	53	51	71	63	41	52	67	93	40	9 4 8 5 2 7 3 6 0 1
40	48	55	57	46	60	71	47	47	52	63	70	47	4 9 8 3 1 7 5 6 0 2
36	55	51	54	51	49	67	65	56	54	59	73	48	9 4 5 8 6 7 1 2 3 0
53	50	62	54	59	61	71	57	56	52	55	70	38	4 9 3 2 5 6 8 1 7 0
43	62	53	57	59	65	69	61	41	42	63	63	48	9 4 3 8 5 2 1 0 7 6
53	55	64	59	58	71	79	57	64	59	61	73	48	4 9 3 6 8 7 1 2 5 0
50	44	64	52	46	58	71	53	56	50	51	70	53	4 9 3 6 5 0 1 8 7 2
50	55	51	47	51	62	69	61	47	52	61	83	46	9 4 3 8 5 7 2 6 1 0
50	48	59	57	46	56	74	61	56	50	57	70	40	4 9 5 1 8 3 6 7 2 0
43	53	70	57	53	64	83	69	64	59	73	75	36	4 9 8 5 6 3 7 1 2 0
43	50	49	59	46	47	69	59	56	56	65	70	61	9 4 8 0 5 1 7 6 3 2
40	58	43	62	41	62	81	65	62	58	76	93	50	9 4 8 5 6 3 1 0 7 2

2-7 Group

T Scores													Rank-Order of Scales
L	F	K	1	2	3	4	5	6	7	8	9	0	
43	58	57	41	75	42	64	69	67	71	53	45	64	2 7 5 6 4 0 8 9 3 1
43	66	48	59	75	62	69	67	65	73	67	55	66	2 7 4 5 8 0 6 3 1 9

L	F	K	1	2	3	4	5	6	7	8	9	0	
40	58	42	62	89	62	62	78	59	87	76	63	66	2 7 5 8 0 9 4 3 1 6
43	58	48	39	69	38	41	53	50	66	59	48	51	2 7 8 5 0 6 9 4 1 3
36	46	55	47	65	49	57	55	53	66	57	53	63	7 2 0 4 8 5 6 9 3 1
56	50	57	41	77	56	46	71	62	77	63	53	53	2 7 5 8 6 3 9 0 4 1
43	53	57	57	77	58	67	55	53	77	67	38	69	2 7 0 4 8 3 1 5 6 9
46	60	53	65	87	69	69	71	65	84	76	50	75	7 2 8 0 5 3 4 1 6 9
53	46	57	67	75	62	50	53	56	69	67	53	52	2 7 1 8 3 6 5 9 0 4
50	48	61	52	70	67	64	65	56	73	61	53	44	7 2 3 5 4 8 6 9 1 0
36	53	51	54	87	60	67	71	59	79	65	55	64	2 7 5 4 8 0 3 6 9 1
50	53	53	57	82	58	57	63	50	73	69	55	71	2 7 0 8 5 3 1 4 9 6
40	55	42	41	84	53	67	61	56	69	67	55	63	2 7 8 4 0 5 6 9 3 1
36	70	51	54	70	56	60	57	44	69	65	65	60	2 7 8 9 4 0 5 3 1 6
43	53	42	39	77	56	46	65	53	71	61	55	70	2 7 0 5 8 3 9 6 4 1
50	48	36	57	72	64	43	59	50	71	61	63	68	2 7 0 3 9 8 5 1 6 4
43	55	51	70	77	69	60	69	53	83	76	55	69	7 2 8 1 3 0 5 4 9 6
50	66	53	57	77	69	64	71	67	83	73	58	76	7 2 0 8 5 3 6 4 9 1
46	58	61	67	84	73	53	53	47	77	53	38	66	2 7 3 1 0 8 5 4 6 9
46	46	64	62	70	60	62	55	56	75	67	58	45	7 2 8 4 1 3 9 6 5 0
50	53	55	57	65	55	50	65	50	75	63	45	53	7 2 5 8 1 3 0 4 6 9
50	50	68	59	75	64	67	61	59	71	63	43	61	2 7 4 3 8 5 0 1 6 9
43	50	64	70	77	56	63	51	44	87	74	50	63	7 2 8 1 0 3 4 5 9 6
60	58	62	49	68	64	55	63	59	75	67	40	50	7 2 8 3 5 6 4 0 1 9
40	46	59	52	65	45	62	63	64	66	53	55	41	7 2 6 5 4 9 8 1 3 0
50	55	59	52	70	53	60	59	50	89	57	45	58	7 2 4 5 0 8 3 1 6 9
53	58	42	62	65	64	53	63	62	71	63	63	60	7 2 3 9 8 5 6 1 0 4
46	53	51	49	80	55	57	59	45	66	65	55	63	2 7 8 0 5 4 9 3 1 6
36	58	51	49	75	55	55	65	47	79	71	60	74	7 2 0 8 5 9 4 3 1 6
50	65	49	82	92	69	60	65	70	89	84	53	81	2 7 8 1 0 6 3 5 4 9

Normal

T Scores													Rank-Order of Scales
L	F	K	1	2	3	4	5	6	7	8	9	0	
40	57	55	49	63	60	57	73	44	52	57	60	54	2 3 9 5 4 8 0 7 1 6
41	46	49	39	51	45	46	57	50	50	36	50	47	5 2 9 7 6 0 4 3 1 8
43	50	48	44	39	51	50	47	41	44	38	55	48	9 3 4 0 5 7 1 6 2 8
46	46	57	49	51	56	64	43	67	54	55	55	46	6 4 3 9 8 7 2 1 0 5
36	50	57	49	53	58	53	60	53	52	64	58	51	8 5 3 9 2 4 6 7 0 1
53	46	57	47	48	57	36	51	44	56	57	55	47	8 7 9 3 5 2 1 0 6 4
60	50	64	53	37	58	55	45	56	50	53	53	42	3 6 4 9 8 1 7 5 0 2
53	48	70	52	44	62	67	65	56	56	55	55	40	4 5 3 7 6 9 8 1 0 2
46	53	53	44	46	49	60	55	56	56	61	55	41	8 4 7 6 9 5 3 2 1 0
43	48	49	41	53	51	41	63	44	56	48	40	53	5 7 0 2 3 8 6 4 1 9
46	53	55	52	58	58	57	57	50	58	59	55	54	8 7 2 3 4 5 9 0 1 6
40	62	51	44	41	55	57	59	55	45	49	60	43	9 5 4 6 3 8 7 1 0 2
53	50	66	49	56	62	57	57	50	46	51	43	46	3 4 5 2 8 6 1 7 0 9
53	46	64	54	48	58	57	59	56	48	50	58	40	5 3 9 4 6 1 8 2 7 0

L	F	K	1	2	3	4	5	6	7	8	9	0										
43	50	57	54	48	51	60	49	50	60	57	63	40	9	7	4	8	1	3	6	5	2	0
50	58	48	44	53	44	53	55	53	52	58	60	44	9	8	5	4	2	6	7	3	1	0
50	60	57	59	60	58	60	58	59	60	55	58	51	7	4	2	1	6	9	5	3	8	0
60	50	64	53	41	58	55	45	56	50	53	53	42	3	6	4	9	8	1	7	5	0	2
40	46	61	54	47	51	46	44	41	56	53	60	51	9	7	1	8	0	3	2	4	5	6
53	46	57	52	58	56	57	56	59	50	40	55	51	6	2	5	4	3	9	1	0	7	8
66	55	75	49	46	57	57	55	44	58	59	58	47	8	7	9	4	3	5	1	0	6	2
53	48	57	52	51	51	60	59	56	54	49	58	47	4	5	9	6	7	1	2	3	8	0
50	62	62	59	46	60	62	57	53	58	53	50	45	4	3	1	7	5	8	6	9	2	0
43	50	59	41	58	53	60	51	44	57	59	46	45	4	8	2	7	3	5	9	0	6	1
36	50	48	41	46	51	43	53	59	56	53	48	40	6	7	8	5	3	9	2	4	1	0
43	48	61	57	48	64	60	55	59	50	50	48	40	3	4	6	1	5	7	8	2	9	0
40	50	68	57	44	58	53	41	56	60	48	43	40	7	3	1	6	4	8	2	9	5	0
53	46	64	58	60	55	60	59	44	60	57	63	50	9	7	4	2	5	1	8	3	0	6
40	60	57	54	53	57	60	57	41	50	55	60	46	9	4	3	5	8	1	2	7	0	6
46	78	59	49	58	51	60	51	41	54	50	60	40	9	4	2	7	5	3	8	1	6	0

APPENDIX B

Letter Sent to Subjects

Perceptual Research Project
Department of Psychology
Building E
University of Florida
Gainesville, Florida

April 2, 1965

Dear Mr.

You have been selected to participate in an important experiment in regard to perceptual research. This is an activity which you should enjoy as it involves a pleasant and interesting series of perceptual stimuli and the time consumed is less than an hour.

I have arranged an appointment for you at the time and place indicated below. It is very important that you participate. If the designated time is inconvenient for you, please call 2-1373 or 8-2871, and one of the secretaries will give you an appointment at a time convenient to you.

I realize that the press of final examinations is hard upon you, but I believe you will find this stimulating research project a welcome study break.

Thank you for your cooperation.

Sincerely,

John S. Currie, Chief
Perceptual Research Project

Place: 102, Building E (West end)
Time:

APPENDIX C

Answer Sheet for Block Counting Task

Name______________________Sex_______Student Number_______Age______

College & Class_________________

1.______
2.______
3.______
4.______
5.______
6.______
7.______
8.______
9.______
10.______
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13.______
14.______
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16.______
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53.______
54.______
55.______
56.______
57.______
58.______
59.______
60.______

APPENDIX D

Instructions Read to Subjects

This experiment relates to perceptual research. You will be confronted with drawings of piles of blocks. Look at each one and determine the total number of blocks in the pile. Record your answer opposite the corresponding drawing number on the answer sheet. (Present stimulus number one.) Here is the first drawing. Record your answer, three, opposite number one on your answer sheet. In some of the drawings some of the blocks will not be visible. So count the number visible, infer the number not visible, and put the total number of blocks for that pile on the answer sheet. All the blocks in a given pile are the same size and shape. If you are in an introductory psychology course, record the course number at the top of the page. In the top right hand corner put the number ______ (the appropriate SED was inserted).

APPENDIX E

Norms to Which Subjects Referred

76 - 101	G
65 - 84	UG
50 - 75	HS
25 - 55	JH

APPENDIX F

Instructions in the Frustrating Condition

At this point we will make a notation on your answer sheets. (Each S's answer sheet was then successively carried to a desk at the rear of the room and four digits were written at the top. The first two were random and the last two ranged from 50 through 59.) A coded progress score has been written on your answer sheets in standard score form. To decipher the code, drop the first two digits. The last two digits represent your norm progress score thus far on the test. Now note the norms on the board to interpret your progress score. The norms we have gathered are arranged in brackets in the following manner from top to bottom: Graduate, Undergraduate, High School, Junior High. (Present stimulus number 31.) Here is number 31. Note that we are starting again with a simple problem so that you may check your method of counting the blocks, in case you are not doing as well as you would like.

BIOGRAPHICAL SKETCH

John Stuart Currie was born in McBee, South Carolina, on October 6, 1938. In June, 1957 he graduated from Forest Park High School in Forest Park, Georgia. He enrolled in Mercer University in September, 1957 and received the Bachelor of Arts degree from Florida State University in June, 1961. He enrolled in the Graduate School, University of Florida, in September, 1961 and was awarded graduate assistantships for the first academic year. He served as a psychology trainee at the Biloxi, Mississippi, Veterans Administration Center in the summer of 1962. In September, 1962 he was awarded a graduate scholarship by the Georgia Department of Public Health. He married the former Beverly Jo Unick in Miami, Florida, in September, 1962 and received the Master of Arts degree in psychology at the University of Florida in December, 1962. He was accepted into the doctoral program in clinical psychology at the University of Florida and interned at Milledgeville State Hospital, Milledgeville, Georgia, for one year in 1964. In January, 1965 he returned to the University of Florida to complete requirements for the Doctor of Philosophy degree and was employed by the Alachua County Health Department as a psychological examiner.

John Stuart Currie is a member of Psi Chi and an associate member of the American Psychological Association. He will join the faculty of the University of Georgia in July, 1965.

This dissertation was prepared under the direction of the chairman of the candidate's supervisory committee and has been approved by all members of that committee. It was submitted to the Dean of the College of Arts and Sciences and to the Graduate Council, and was approved as partial fulfillment of the requirements for the degree of Doctor of Philosophy.

August 14, 1965

E. Ruffin Jones

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